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# Seats

**Model: F01/F02**

**Production: From Start of Production**

# OBJECTIVES

After completion of this module you will be able to:

- Understand the seat configurations in the F01/F02
- Locate and identify components of the seat systems in the F01/F02

# Introduction

## Front Seat Equipment

The front seating arrangement of the F01/F02 consists of the multi-function seat as standard equipment. The multi-function seat (Comfort Seat) features 16-way adjustment with 4-way lumbar support which includes the articulated upper backrest, adjustable backrest width, adjustable thigh support, and Active Head Restraints with adjustable side support.

The front seat also have memory settings for the driver and passenger seats.

An electropneumatic system is installed for lumbar support and the active seat. The advantage of electropneumatics lies in the fact that the overall weight of the seat is reduced.

The active seat is a part of the Luxury Seating package and features pneumatic control rather than the previous fluid based control system on the E65.



The front side airbag (1) is integrated into the backrest of the driver's and front passenger seat. The seat back extends into the seat side. This is known as "encompassing seat wall". When the airbag is triggered, the side is pushed a little. This allows the airbag to open and provide its protective function. The front seats are equipped with seat-occupancy recognition (passenger) and a belt tensioner.

In the F01/F02, the button for the passenger-assist function (gentleman function) is integrated into the armrest of the driver's door. After pressing the button, the driver is able to operate the front-passenger seat using his own seat adjustment buttons.

For example, this allows you to make more space, e.g. before someone gets in on the passenger’s side.

The front seats are equipped with crash-active head restraints. In the memory seat, the head restraints have a button for adjusting the distance to your head.

In the multifunction seat, the distance is adjustable using the upper backrest adjustment.

**Rear Seat Options**

In the F01/F02, there are two seat models, the basic seat and the optional comfort (multi-function) seat. The rear comfort seat is part of the “Luxury Rear Seating” package which also includes the rear ventilated seats.

On the F02, there is also a “stand-alone” option for the massage function.

All seat equipment comes with the center armrest cup holder. There are two styles for the center armrest. See the following comparison.



Index	Explanation	Index	Explanation
1	Center armrest w/o comfort seat	2	Center armrest w/comfort seat

The buttons for the rear seat heating are integrated into the center console.

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## **Multifunction Seat**

The optional massage function can be ordered additionally with the multifunction seat. The massage function is based on current medical knowledge and is integrated into the backrest.

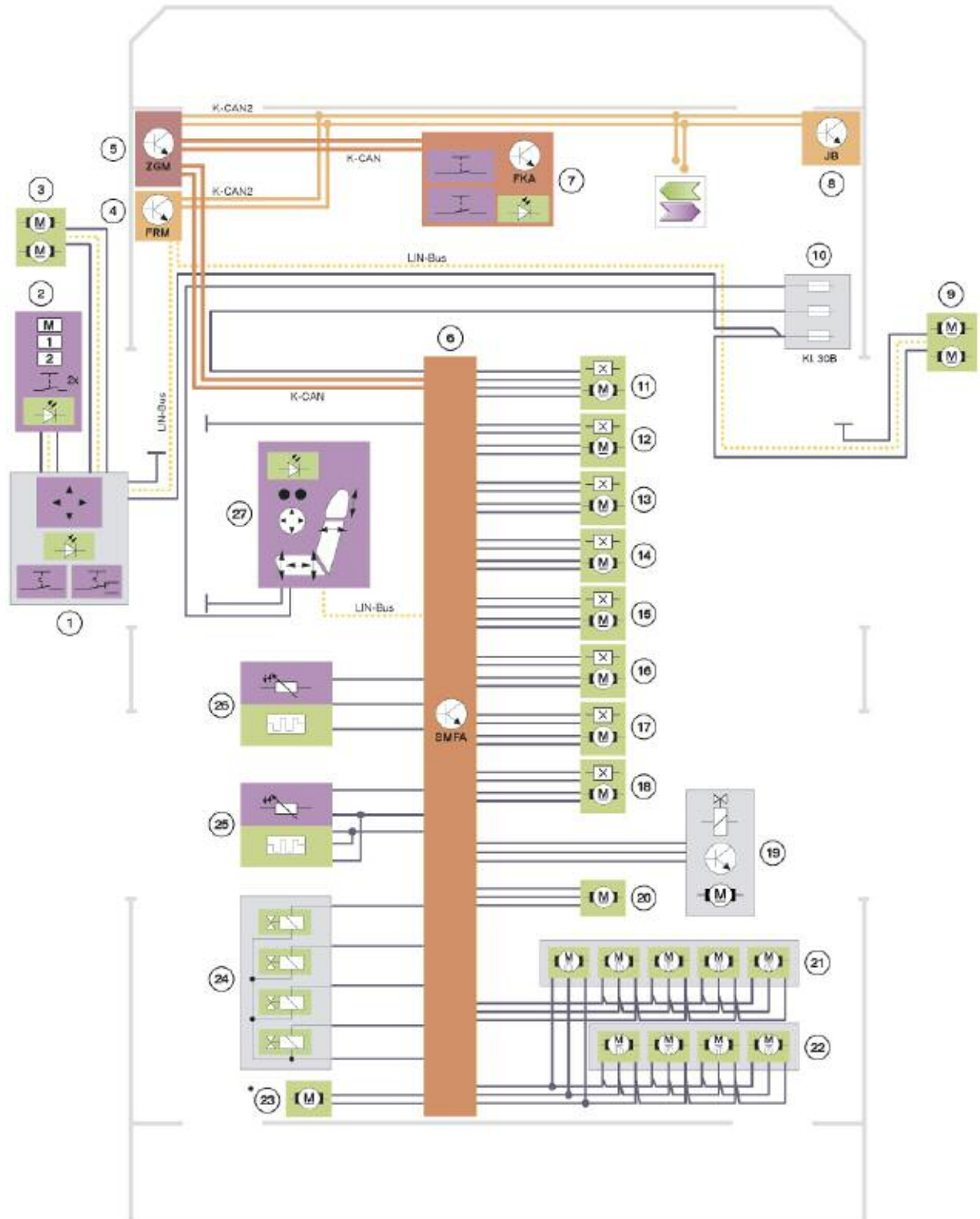
The multifunction seat helps you to feel perfectly refreshed, for example with a back massage on a stressful day.

So that customers are provided with the best sense of well-being, they can select from two different massage intensity levels.

A new feature of the seat air conditioning function in the multifunction seat is that only two fan motors are installed for the ventilation. The fan motors draw in some fresh air from the rear footwell. The fresh air is then guided via air ducts through the multifunction seat until it reaches the backrest and seat surfaces. This helps to provide a pleasant air-temperature control for customers.

# System Overview

## System Circuit Diagram, Multifunction Seat (comfort seat)





Index	Explanation	Index	Explanation
1	Switch block, driver's door	17	Motor, head-restraint height adjustment
2	Button block in the armrest, driver's side	18	Motor, backrest-width adjustment
3	Motors, mirror adjustment, driver's side	19	Pump, lumbar support/active seat
4	Footwell module (FRM)	20	Pressure distributor, active seat
5	Central gateway module (ZGM)	21	Fan, active seat ventilation, seat surface
6	Driver's seat module (SMFA)	22	Fan, active seat ventilation, backrest surface
7	Integrated automatic heating/air conditioning (IHKA)	23*	Lumbar support pump
8	Junction box electronics (JB)	24	Lumbar support, solenoid valves
9	Motors, mirror adjustment, passenger's side	25	Seat-heating pad, seat surface
10	Fuses in the front distribution box	26	Seat-heating pad, backrest surface
11	Motor, longitudinal seat adjustment	27	Seat function buttons, driver's seat
12	Motor, seat-inclination adjustment	K-CAN2	Body CAN2
13	Motor, seat-height adjustment	K-CAN	Body CAN
14	Motor, backrest-inclination adjustment	LIN-Bus	Local interconnect network bus
15	Motor, seat-depth adjustment	KI. 30B	Terminal 30 basic operation
16	Motor, upper backrest adjustment (LKV)		

\* Pump in a vehicle equipped with lumbar support. In a vehicle equipped with active seats, a different pump is used. This pump supplies the active seat and lumbar support with air.



### K-CAN signals at the seat module

In/Out	Information	Source/sink	Function
In	Outside temperature	Outside temperature sensor > instrument cluster	Ambient conditions when faults are stored
In	Power reduction stage	Energy management system > digital engine control	Power reduction of seat heating

# Functions

## Electric Front Seat Adjustment

The seats can be adjusted from terminal 30B ON. The seat-adjustment switch simply has to be pressed in the desired direction. The seats can have up to eight adjustment axes.

The seat adjustment options are listed in the following table:

Index	Comfort (Multi-function seat)	
	Driver's side	Passenger's side
Seat height adjustment	X	X
Longitudinal seat adjustment	X	X
Seat inclination adjustment	X	X
Backrest inclination adjustment	X	X
Head restraint height adjustment	X	X
Seat depth adjustment	X	X
Backrest width adjustment	X	X
Upper backrest adjustment	X	X

Activation of the seat adjustment motors differ depending on the seat equipment.

For example, the seat-adjustment switches are evaluated either directly or via the LIN bus.

**Seat Adjustment Options**

With the maximum equipment specification, the F01/F02 seats can be adjusted in eight directions back and forth.

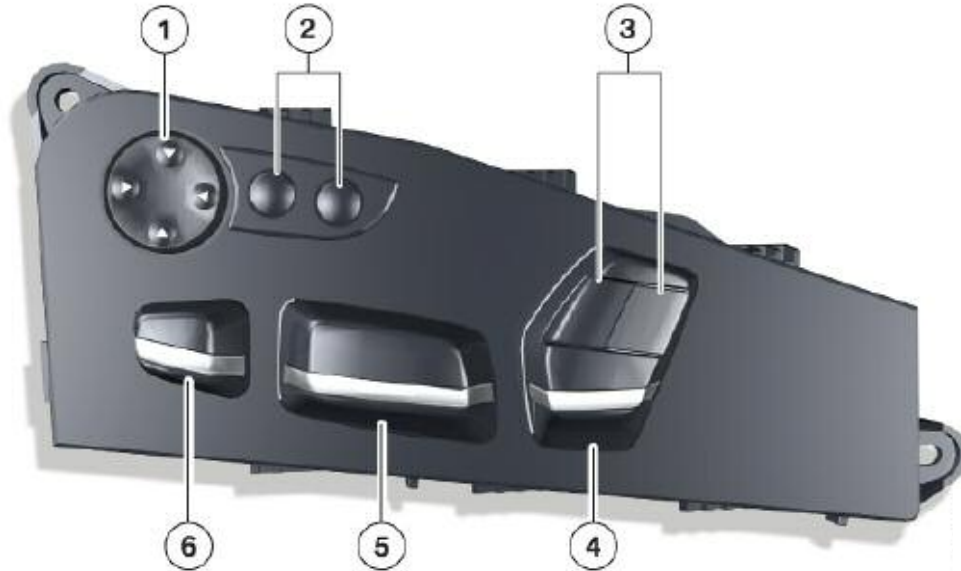
**Maximum seat adjustment axes using the F01/F02 multifunction seat as an example**



Index	Explanation	Index	Explanation
1	Head restraint height adjustment	5	Seat height adjustment
2	Upper backrest adjustment	6	Seat inclination adjustment
3	Backrest inclination adjustment	7	Seat depth adjustment
4	Longitudinal seat adjustment	8	Backrest width adjustment

The seat can be adjusted with the seat adjustment switches. The seat adjustment switches on the comfort seat (multifunction seat) are used again as an example here.

**Seat adjustment switches in the F01/F02 multifunction seat with memory function**



Index	Explanation	Index	Explanation
1	Lumbar support adjustment	4	Backrest inclination and head restraint height adjustment
2	Backrest width adjustment	5	Longitudinal seat, seat height and seat inclination adjustment
3	Upper backrest adjustment	6	Seat depth adjustment

**■ Seat position recording in the US**

There is seat calibration in the US version for the driver's and the front-passenger seat. Seat calibration is important, because during the course of many seat adjustments, the seat position may lose accuracy. This generates a Check Control message. Refer to the section entitled Service information.

## Front Seat Memory Function

The memory function is available for both the driver's and front-passenger seats. The memory buttons are located on the armrest. The memory function can be activated from terminal 30B ON. The memory function is integrated into the seat module. The seat module of the seat concerned has sole responsibility for this function.

Two memory positions and the current seat position can be stored.

The memory buttons are integrated into the armrest of the vehicle's doors and connected via the LIN bus to the footwell module.

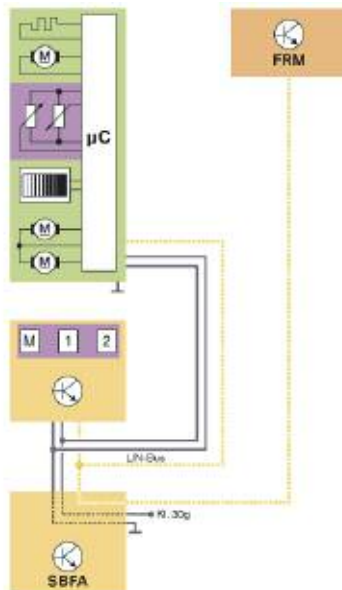
The LIN bus is "looped through" the switch block of the driver's door. This means that the LIN bus cable is routed from the footwell module to the switch block in the driver's door. From the switch block in the driver's door, the LIN bus is routed further to the memory buttons and the door mirror.

The footwell module evaluates the button status and sends it via the K-CAN2.

The footwell module sends the button status via the K-CAN2 to the central gateway module. The central gateway module receives the signal and issues it on the K-CAN. The seat module evaluates the signal and initiates the storing of the memory position, when requested to do so.

Press the memory button to prepare for storing the memory position. The seat module sends the request to switch on the function indicator. From the function indicator, for example, the customer can recognize that the memory function is ready for storing.

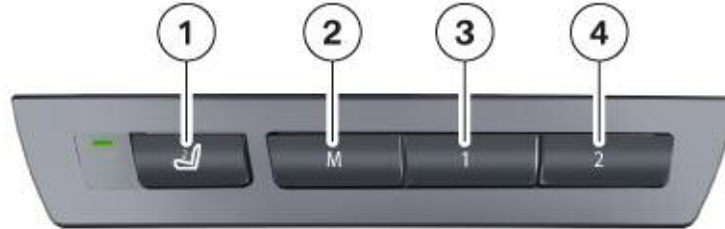
### F01/F02 LIN bus loop-through connection



Index	Explanation	Index	Explanation
1	Door mirror, driver's side	3	Switch block, driver's door
2	Memory button block	4	Footwell module

Pressing button “1” or “2” assigns the current position of the driver’s seat to the pressed button. One memory position is available for each of the buttons “1” and “2”.

**Button block in the armrests of the F01/F02 driver's side**



Index	Explanation	Index	Explanation
1	Passenger assist function button	3	Button 1
2	M button	4	Button 2

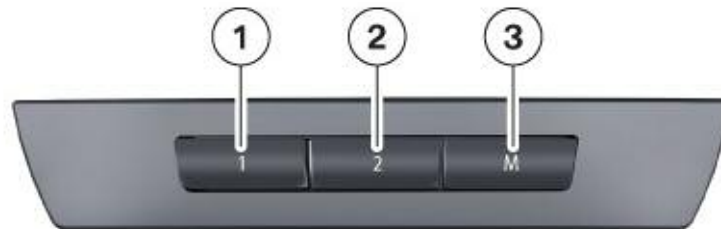
The data is assigned to the current ID transmitter as part of the Personal Profile, when the memory position is stored.

The button for the passenger-assist function is integrated into the armrest on the driver’s side. This function is available in seat models with memory function.

**■ Button illumination**

The footwell module sends the status of the terminal 58g. The seat module receives the status of the terminal 58g via the K-CAN. The seat module passes the status of terminal 58g via the LIN bus to the memory buttons.

**F01/F02 memory buttons on the passenger's side**



Index	Explanation	Index	Explanation
1	M button	3	Button 2
2	Button 1		

**Memory function for the door mirrors and steering column**

Pressing the memory "M" button followed by button "1" or "2" assigns the current position of the door mirrors and steering column to the pressed button.

The seat module sends the request to store the door mirror and steering column position via the K-CAN. The central gateway module transfers the signal to the K-CAN2. The footwell module then stores the position.

The door mirror position is assigned to the memory position of the driver's seat. Due to this fact, the current position of the door mirrors is also assigned to the pressed button "1" or "2".

**Note: The memory position of the door mirrors and the electric steering column adjustment are stored in the footwell module.**

### Passenger-assist Function

The passenger-assist function is available from terminal 30B ON. The seat module on the driver's side alone is responsible for the passenger-assist Function. The button status is read in by the footwell module via the LIN bus and sent via the K-CAN2. The central gateway module transfers the signal to the relevant bus system.

As soon as the driver's seat module SMFA detects an operation request from the passenger-assist function button, it prepares the front-passenger seat module for an adjustment request via the K-CAN.

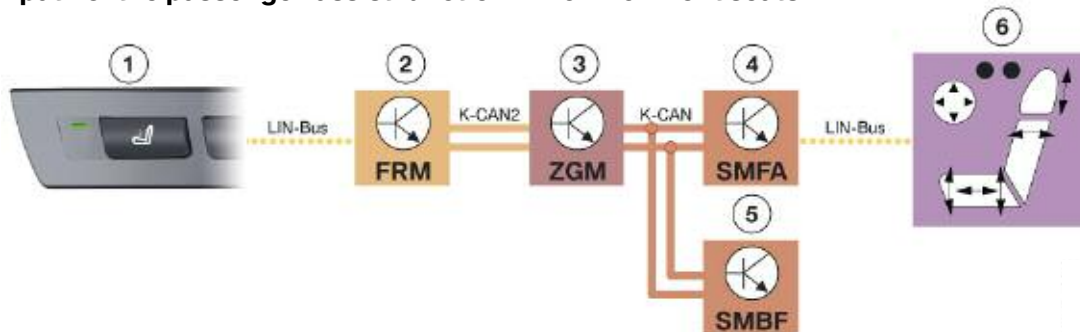
When the seat adjustment switch on the driver's side is now activated, the seat module on the passenger's side executes the request.

The K-CAN is used for communication between the seat modules. This allows all seat adjustment functions for the front-passenger seat and the memory function to be operated from the driver's seat. The passenger-assist function is available for the memory seat and the multifunction seat.

The seat module sends the request via the K-CAN to the function indicator for the activated passenger-assist function button in order to switch on the LED in the button. The request must be transferred on more than one bus system.

**Note: A seat adjustment made via the buttons on the front-passenger seat has priority over those made from the driver's seat.**

### Signal path of the passenger-assist function in F01/F02 front seats



Index	Explanation	Index	Explanation
1	Passenger-assist function button	4	Driver's seat module
2	Footwell module	5	Passenger's seat module
3	Central Gateway Module	6	Buttons, seat functions, driver's seat

## Front Seat Heating

The seat heating is standard as part of the comfort seats. The seat module is functionally responsible for seat heating.

The seat heating can only be activated from terminal 15 ON. The status of terminal 15 ON is issued by the Car Access System 4 via the K-CAN2. The junction box electronics thus know the status of terminal 15.

The central gateway module transfers the signal to the K-CAN. The seat module is connected to the K-CAN and receives the status of terminal 15.

The button for the seat heating is located in the IHKA/audio control panel. The control panel is connected to the control unit of the integrated automatic heating and air conditioning system.

Pressing the seat heating button, selects the heating stage as shown in the following list.

Heating stage	Seat heating pads
3	High
2	Medium
1	Low
0	Off

If the button is pressed for longer than 1.2 seconds with the seat heating activated, the seat heating will be switched off.

If, after terminal 15 OFF, the junction box electronics receive the status terminal 15 ON within 15 minutes, then the last selected function that was activated will come into operation.

The indicator for the selected heating stage is controlled by the seat module. The signal must be sent via several bus systems.

The seat heating module is connected to terminal 30B for the seat-heating load current.

### IHKA/audio control panel with buttons for F01/F02 seat heating



Index	Explanation	Index	Explanation
1	Seat-heating button, driver's seat	2	Seat-heating button, front passenger's seat



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## Seat Heating with Seat Module

When the vehicle wakes up, the junction box electronics determine whether a seat module is installed in the vehicle. It sends a corresponding query via the K-CAN2 for this purpose. The central gateway module transfers the signal to the K-CAN. This allows the seat module to receive the request, respond to it via the K-CAN and take control of the seat heating function.

The seat module has sole responsibility for the seat heating function. The integrated automatic heating and air conditioning system evaluates the button status and sends the button status via the K-CAN to the seat module.

The seat module evaluates the requests for the desired heating stage, as well as controls and monitors the seat heating functions. The seat-heating pads are connected to the seat module. A NTC resistor in the seat-heating pad is monitored to control the temperature.

Depending on the heating stage, the seat module sends the request for the function to be indicated in the button LEDs to the integrated automatic heating and air conditioning system.

The seat module is connected to terminal 30B for the seat-heating load current.

A fault in the seat-heating system results in a corresponding entry in the fault memory of the driver's seat module.

### ■ Power reduction of seat heating

The energy management system in the vehicle can activate the seat heating at a reduced power level corresponding to the vehicle's energy balance. The energy management is located in the digital engine-control system.

The digital engine control sends the request to reduce power via the PT-CAN. The central gateway transfers the information to the KCAN. This allows the seat module to receive the request to reduce power.

The reduction stages are:

- Operation of seat heating in Stage 2
- Operation of seat heating in Stage 2 at only 50%
- Seat heating OFF.

**Note: In the event of a power reduction, the LEDs in the seat-heating buttons are not switched off.**

During a starting cycle (terminal 50 ON) or when the seat adjustment switch is operated, the seat module prevents the seat heating from functioning. The LED indicator for the activated seat heating remains lit.

## Heating Circuit for the Seat Heating

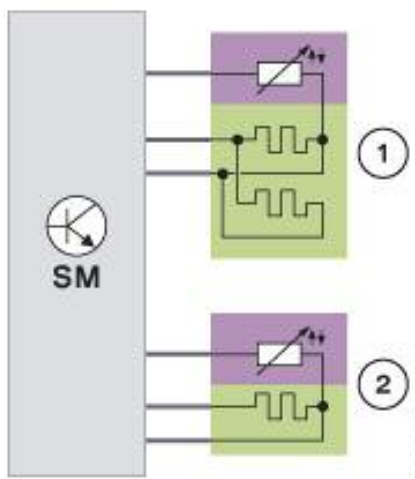
The F01/F02 seats are equipped with a two-circuit seat heating system.

### ■ Two-circuit seat heating system

A seat-heating pad is located in the surface of the backrest. Two seat-heating pads are integrated into the seat surface. Both seat-heating pads are supplied with power by the seat module.

There is a NTC resistor in each seat-heating pad in the backrest and seat surfaces. This serves as a temperature control.

### Schematic diagram of the two-circuit seat heating system



Index	Explanation
1	NTC resistor in the backrest-surface seat heating pad
2	NTC resistor in the seat-surface seat heating pad

The customer can adjust the seat heating air stratification individually. Select the menu item “Settings” using the controller in the Central Information Display.

Settings

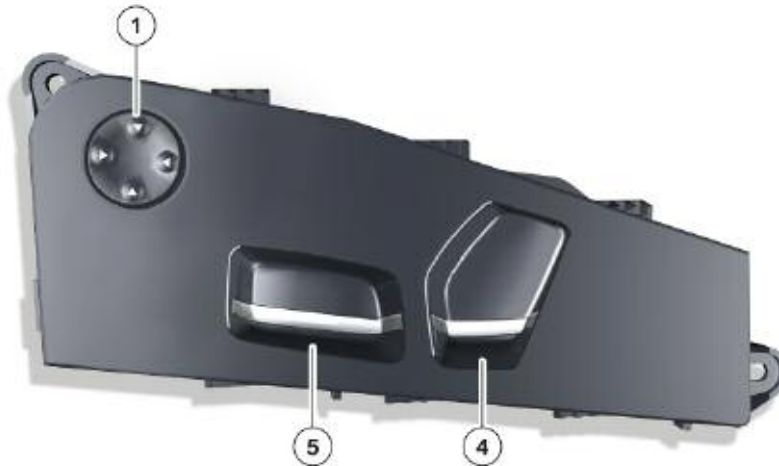
- > Air conditioning
  - > Seat heating distribution
    - > Driver
      - > Front passenger

## Front Lumbar Support

Using lumbar support, the backrest can be individually adapted to the spinal column and thus ensures relaxed driving. Lumbar support is a standard feature in the multifunction seat.

The button for the lumbar support adjustment is located on the side of the front seat and is connected via the LIN bus to the seat module. The function of the lumbar support is integrated completely in the seat module. The lumbar support is adjustable from terminal 30B ON.

### Seat adjustment switches and lumbar support switch



Index	Explanation	Index	Explanation
1	Button for lumbar-support adjustment	5	Longitudinal seat, seat-height and seat inclination adjustment
4	Backrest inclination and head restraint adjustment		

The seat module requests the button status for the lumbar support adjustment via the LIN bus on a cyclical basis. Lumbar support is provided by two inflatable air cushions in the backrest. The desired air cushion is inflated with air or deflated via two solenoid valves until such time that the button for the lumbar-support adjustment is released.

The pump for lumbar-support adjustment delivers the required air pressure. The pump and the solenoid valves are activated from the seat module.

**Note: Seats with the lumbar support option are generally fitted with a seat module. For this reason, all seat heating or seat adjustment functions are located in the seat module.**

**The seat adjustment switches are read in from the seat module via the LIN bus.**

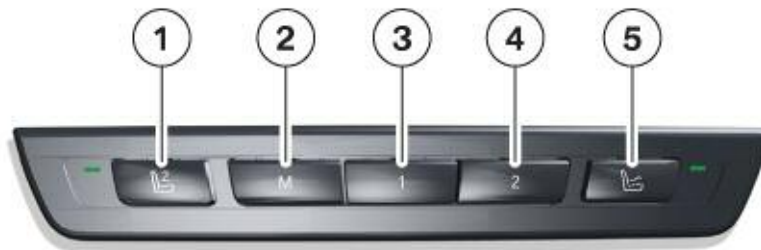
## Front Active Seat

Active seat function can be activated from the status terminal 15 ON with the Active Seat button. The button is located in the armrests of the front door of the vehicle.

The seat module has sole responsibility for this function.

The footwell module requests the button status via the LIN bus and sends this via the K-CAN2. The central gateway transfers the signal to the K-CAN. This allows the seat module to receive the button status. The seat module evaluates the button status. If there is a request to switch on the active seat, then this is executed by the seat module.

### Button block in the armrest of the F01/F02 driver's side

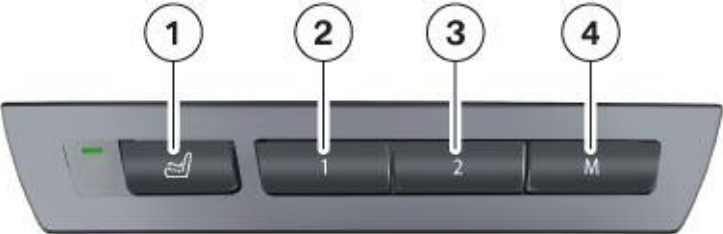


Index	Explanation	Index	Explanation
1	Passenger assist button	4	Button 2
2	M button	5	Active Seat button
3	Button 1		

A powerful pneumatic pump is used for the active seat and lumbar support functions. The pump supplies the air cushion, for the lumbar support and the active seat with the required volume of air. For this reason, the pump is somewhat larger than that which is found in a vehicle without the active seat option.

**Note: Lumbar-support adjustment has priority over the active seat. For lumbar-support adjustment, the pump for lumbar-support adjustment runs at maximum speed. For the active-seat function, the pump for lumbar support adjustment runs at roughly half this speed.**

**Button block in the armrest of the F01/F02 front-passenger's side**

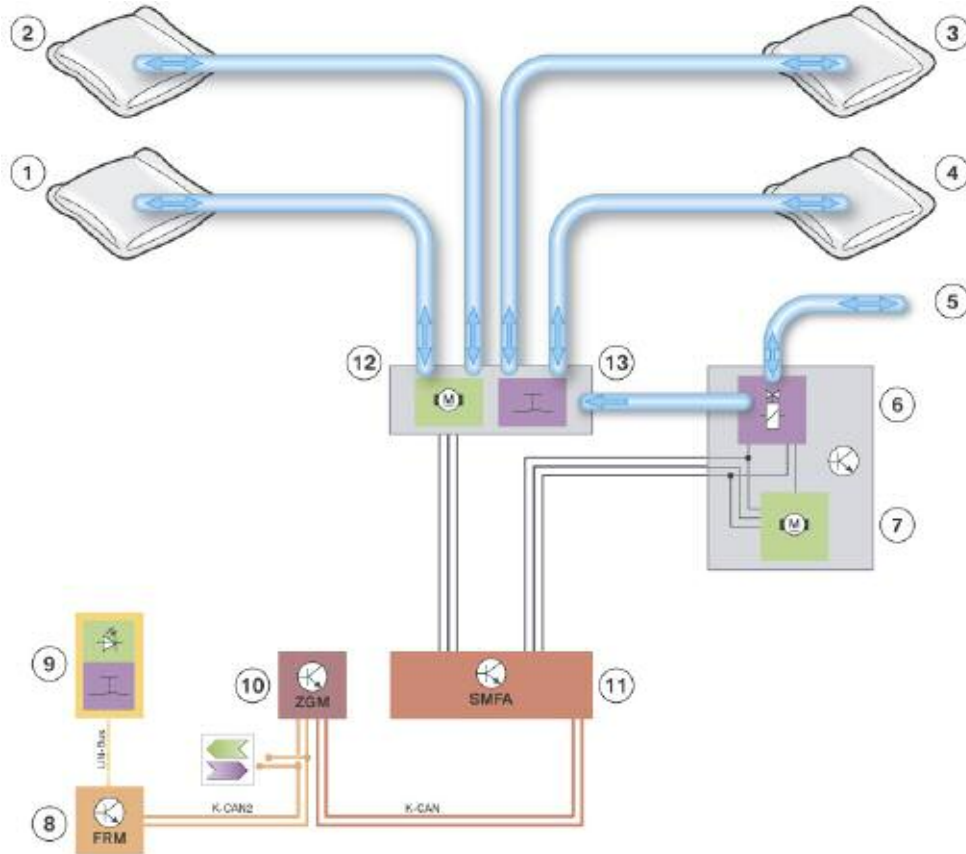


Index	Explanation	Index	Explanation
1	M button	3	Button 2
2	Button 1	4	Active seat button

If, after terminal 15 OFF, the seat module receives the status terminal 15 ON within 15 minutes, then the last selected function that was activated will come into operation.

## System Overview

### Basic activation of F01/F02 active seat



Index	Explanation	Index	Explanation
1	Lower air cushion, left	9	Active seat buttons with function indicator
2	Upper air cushion, left	10	Central gateway module (ZGM)
3	Upper air cushion, right	11	Driver's seat module (SMFA)
4	Lower air cushion, right	12	Distributor module, active seat
5	Output, lumbar-support adjustment	13	Air supply, active seat
6	Solenoid valve, changeover, active seat/lumbar-support adjustment	K-CAN	Body CAN
7	Pump for lumbar-support adjustment/ active seat	K-CAN2	Body CAN2
8	Footwell module (FRM)	LIN-Bus	Local Interconnect Network bus



## K-CAN signals at the seat module

In/Out	Information	Source/sink	Function
In	Outside temperature	Outside temperature sensor > instrument cluster	Ambient conditions when faults are stored
In	Yaw rate	Yaw rate sensor > Integrated Chassis Management	Suspend active seat function
In	Power management	Digital engine control > Seat module	Brief suspension, in order to maintain enough power in the vehicle electrical system

Four air cushions are integrated in the seat surface for the active seat. Two air cushions, one on top of the other, are used in both the left and right seat halves.

The air cushions are inflated with air supplied by the pump for the lumbar-support adjustment. A solenoid valve is integrated in the pump unit. The function of the solenoid valve is to change over the air supply. This ensures that only one function (lumbar support adjustment or active seat) is ever executed.

A distributor module is available for inflating the air cushions. The seat module delivers power to the distributor module as soon as the active seat is switched on.

The distributor module houses a motor, which drives an eccentric shaft. The rotation of the eccentric shaft causes the air inlets to the seat cushions to open or close.

The seat cushions are alternately inflated or deflated, depending on the position of the eccentric shaft. The air inlets are closed when the system is switched off and in the breaks between inflation or deflation.

A switch contact is integrated in the distributor module to switch on the pump for lumbar-support adjustment. The rotation of the eccentric shaft actuates the contact, which thereby signals activation to the seat module. The seat module switches on the pump for lumbar-support adjustment and changes over the solenoid valve to inflation of the seat cushions.

### ■ Undervoltage

If the function fails due to undervoltage when the active seat is switched on, the active seat must be calibrated. The function does this by itself. The seat cushions are completely deflated the next time the active seat is switched on. The active-seat function is then ready for operation again.

---

### ■ **Suspension of functions**

In the interest of avoiding irritation when cornering at high speed, the active-seat function is stopped immediately in the event of excessive lateral acceleration.

The lateral-acceleration signal comes from the yaw-rate sensor. The Integrated Chassis Management issues the signal via the FlexRay.

The central gateway module transfers the signals to the K-CAN. This allows the seat module to receive the signal for the vehicle's lateral acceleration. The seat module cancels activation when a defined threshold is exceeded. The function indicator however remains lit.

The active seat is switched on again when the lateral-acceleration value drops again.

### ■ **Power management**

Power management is capable of briefly stopping the active seat from functioning. The function indicator however remains lit.

This applies, for example when pressing the starter or to maintain a sufficient energy balance for the vehicle's electrical system.

### ■ **System faults**

In the event of a system fault, the system shuts down or stops in the next center position in order to avoid further damage. A fault memory entry is stored in the seat module.



## Active Seat Ventilation

The active seat ventilation option provides the occupants with individual climate control for the seat and backrest surfaces.

Active seat ventilation is available for both the driver's and front-passenger seats. Active seat ventilation can be activated from the status terminal 15 ON.

Stage 3 is engaged when the button is pressed for the first time. This sets the maximum fan stage for seat and backrest.

The next stage lower or OFF is selected on further pressing of the button. Active seat ventilation is deactivated if the button remains pressed for longer than 1.2 seconds.

### Button, F01/F02 active seat ventilation



Index	Explanation	Index	Explanation
1	Button for active seat ventilation, driver's seat	2	Button for active seat ventilation, pass seat

The button for the active seat ventilation is located in the IHKA/audio control panel. The seat module has sole responsibility for this function. The integrated automatic heating and air conditioning system evaluates the signals for operating the active seat ventilation and sends the button status to the seat module. This allows the seat module to receive the request, activate the fan and monitor their operation.

Depending on the heating stage, the seat module sends the request for the function to be indicated in the button LEDs to the integrated automatic heating and air conditioning system.

Nine fans are accommodated in each seat. The fans are switched on by the seat module and activated separately for backrest and seat surface. For active ventilation, the seat has two speed stages for the fans, depending on the air-conditioning stage. The seat surface has five fans, while the backrest has four fans.

---

### Seat ventilation stages:

Ventilation stage	Fans, seat	Fans, backrest
3	High	High
2	High	Low
1	Low	Low
0	OFF	OFF

After having been activated for a period in excess of 10 minutes, active seat ventilation is automatically switched down from Stage 3 to Stage 2.

The activated seat ventilation function remains stored for up to 15 minutes after the status terminal 15 OFF. The previously selected seat ventilation stage is switched on again if in this time the status terminal 15 ON is received by the seat module.

The energy management system in the vehicle can deactivate active seat ventilation briefly depending on the vehicle's energy balance. The function indicator is retained however.

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## Rear Basic Seat

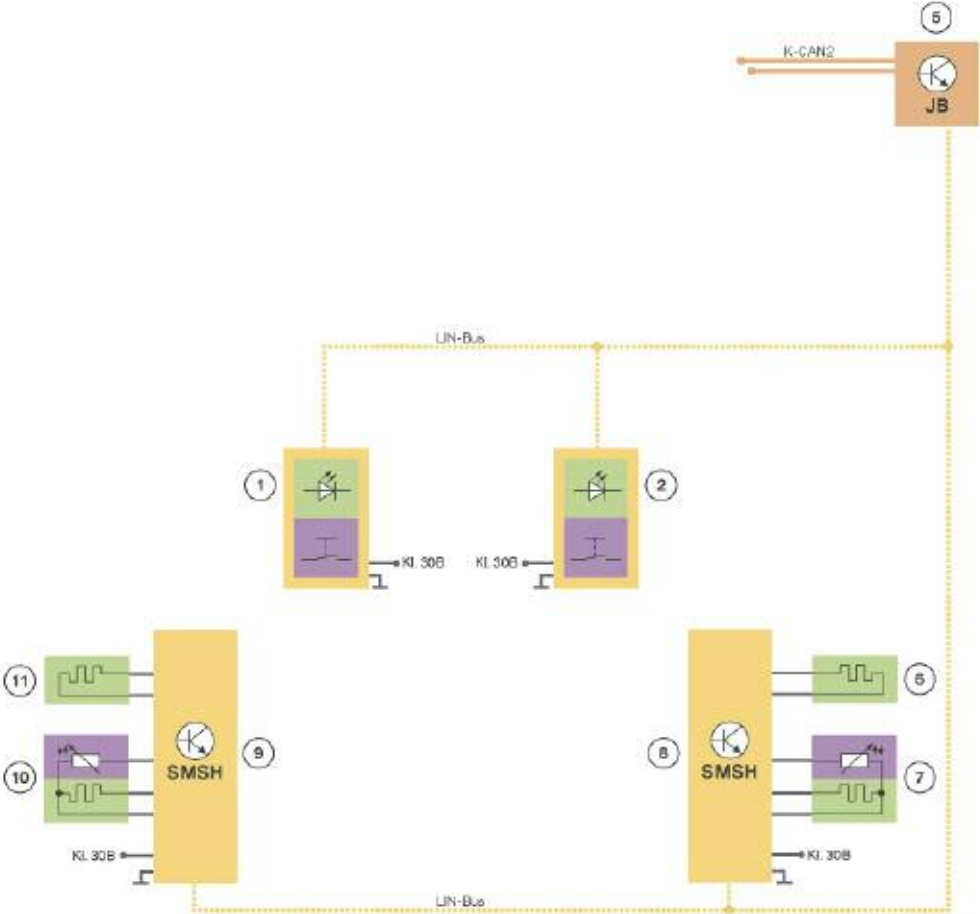
The standard rear seat for the F01 is the basic seat. Seat heating is available for the rear seat as part of the "Luxury seating package".

The rear basic seat offers seating for three people. The seat in the middle is fitted with a folding head restraint.



# Seat Heating in the Rear Basic Seat

## System Circuit Diagram, Rear Seat Heating



Index	Explanation	Index	Explanation
1	Seat-heating buttons, driver's side, with function indicator, rear	9	Seat heating module (SSMH), driver, rear
2	Seat-heating buttons, front-passenger's side, with function indicator, rear	10	Seat heating, seat surface
5	Junction box electronics (JB)	11	Seat heating, backrest surface
6	Seat heating module (SSMH), front passenger, rear	KL. 30B	Terminal 30 basic operation
7	Seat heating, seat surface	K-CAN2	Body CAN2
8	Seat heating, backrest surface	LIN-Bus	Local interconnect network bus

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### ■ Rear seat heating

The seat heating is available for the left and the right seat and each has a heating circuit. A seat-heating pad is located in each backrest and seat surface. The seat heating can only be activated from “terminal 15 ON”.

The seat-heating buttons are integrated under the air vents in the rear center console.

The seat heating function is fully integrated into the junction box electronics.

The junction box electronics evaluate the buttons for the seat heating. To do this the junction box electronics request the current status of the buttons via the LIN bus.

The junction box control unit then transfers the status to the appropriate seat heating module.

The seat heating modules are connected to the junction box electronics via the LIN bus.

**Note: The seat heating modules are coded to detect the installed position. Different pins are switched to terminal 31, i.e. to ground for coding. The connectors are coded.**

The buttons and the seat heating modules are connected to terminal 30B.

The fuses for the buttons and seat heating modules are located in the distribution box in the luggage compartment.

The seat heating can be switched on in three heating stages. The heating stages and their indications are set out in the following table.

Heating stage	Seat	Backrest	LED
3	High	High	3
2	Normal	Normal	2
1	Low	Low	1
0	OFF	OFF	OFF

Regulation of the seat heating is controlled via an NTC resistor in the seat-surface seat-heating pad.

Electronic circuitry for indicating operation of the LED and communication via the LIN bus is integrated in each button.

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### ■ Power reduction of seat heating

The energy management system in the vehicle can activate the seat heating at a reduced power level corresponding to the vehicle's energy balance. The energy management is located in the digital engine-control system.

The digital engine control sends the request to reduce power via the PT-CAN. The central gateway transfers the information to the K-CAN2. The junction box electronics thus know about the request for power reduction.

The junction box electronics send the request for power reduction to the seat heating module.

The reduction stages are:

- Operation of seat heating in Stage 2
- Operation of seat heating in Stage 2 at only 50%
- Seat heating OFF.

**Note: In the event of a power reduction, the LEDs in the seat-heating switch are not switched off.**

During a starting cycle (terminal 50 ON), the seat heating module prevents the seat heating from functioning. The LED indicator for the activated seat heating remains lit.

## Rear-compartment Comfort Seat

The rear-compartment comfort seat is available as part of the luxury rear seating option which is currently only available on the F02.

### F01/F02 rear-compartment comfort seat



Index	Explanation	Index	Explanation
1	Memory buttons	2	Seat adjustment function buttons

The rear-compartment comfort seat also has lumbar support. The comfort seat is also known as the multifunction seat.

The seating in the rear-compartment is designed for **two** persons to increase comfort.

As with its predecessor, the F01/F02 has the seat adjustment switch and memory buttons in separately installed positions.

The seat-adjustment switches are located on the center armrest and are connected via the LIN bus to the seat module. The button for adjusting the lumbar support is located next to the seat adjustment switches.

The memory buttons are integrated into the armrest of the vehicle's rear doors. The memory buttons are connected to the junction box electronics via the LIN bus.

As previously described with the basic seat, the comfort seat also has a method of transferring signals from the seat heating button that differs depending on the equipment installed on the vehicle.

The rear-compartment comfort seat can come with the ventilation feature. Additionally, there is a "stand-alone" option for the massage function.

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## Electric Seat Adjustment for the Rear-compartment Comfort

The comfort seat has the following electric seat adjustment options:

- Seat-inclination adjustment
- Longitudinal seat adjustment SLV (seat distance to front seat)
- Head-restraint height adjustment
- Backrest-inclination adjustment
- Backrest head-inclination adjustment LKV.

The comfort seat has a large seat module that is integrated into the backrest of the seat concerned. All seat adjustment switches are read in by the seat module via the LIN bus. The seat module has sole responsibility for the seat functions. It controls and monitors the function sequences. The seat position of the comfort seat can be adjusted from terminal 30 ON.

**Note: The seat module is connected via the K-CAN for communicating with other persons in the vehicle electrical system.**

The seat module requests the status of the seat adjustment switches via the LIN bus. The seat module activates the adjustment motors in according to the status of the seat adjustment switches. The adjustment motors are activated via the relay in the seat module.

When the seat adjustment switch is released, the seat module cancels activation. The seat module also cancels activation when the adjustment motor is obstructed or when the end position is reached.

An obstructed motor is detected by the current measuring device integrated into the seat module and by failure of the Hall sensor pulses. In this case, the relays are no longer actuated thus shutting down the motors. The seat module also blanks out these adjustment motors when storing the memory position.

Once the motors are unobstructed, they are available to the memory function again.

The seat module stores the malfunctions. In the service workshop, the fault code entry is read out using the diagnostic system.

Fault code memory entries can be:

- Short-circuiting
- Line breaks
- Adjustment motor or Hall sensor is defective.

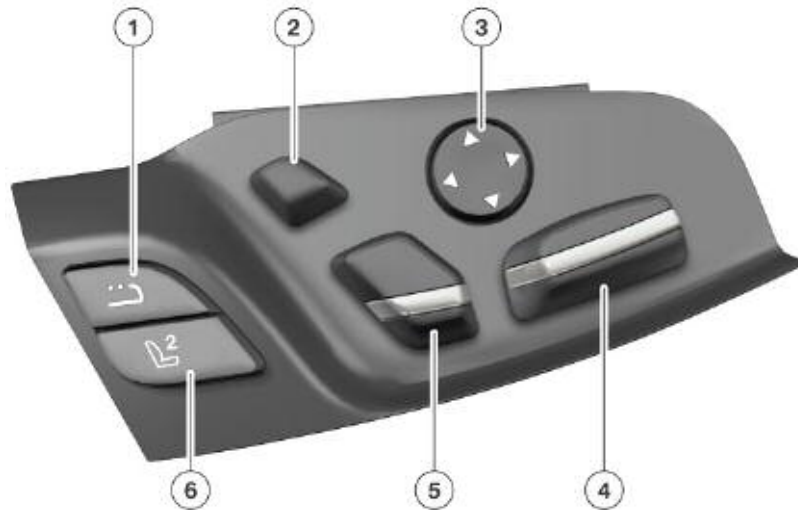


**Buttons for the seat adjustment functions in the F01/F02 rear-compartment comfort seat, driver's side**



Index	Explanation	Index	Explanation
1	Button for lumbar-support adjustment	4	Backrest inclination adjustment
2	Upper backrest and head restraint height adjustment	5	Longitudinal seat, seat height and seat inclination adjustment
3	Reset button		

**Buttons for the seat functions in the F01/F02 rear-compartment comfort seat, front-passenger's side**



Index	Explanation	Index	Explanation
1	Reset button	4	Longitudinal seat, seat height and seat inclination adjustment
2	Upper backrest and head restraint height adjustment	5	Backrest inclination adjustment
3	Button for lumbar-support adjustment		Button for adjusting passenger seat from the rear seat

---

## Other Seat Functions

### ■ Reset function

The reset function enables you to set the comfort seat to a pre-set seat position. After the reset button is pressed, the seat automatically moves into position. It can be used to make the seat more easily accessible during servicing. This, for example, is of benefit to customers and service technicians, because getting out of the vehicle and accessing the comfort seat becomes easier.

**Note: The reset function can also be used for fitting a child seat. After the reset function is activated, the comfort seat is in a better position for fitting the child seat.**

### Reset button



Index	Explanation
1	Reset button for the rear compartment comfort seat

### ■ Position detection

The adjustment motors are equipped with Hall sensors. The Hall sensors generate Hall pulses during activation, which are evaluated by the seat module. The seat module calculates the fixed distance intervals based on the Hall pulses and determines the current seat adjustment position.

The seat position is stored in the seat module and used for the memory position.

### ■ Obstruction detection

The seat module records the Hall sensor pulses of the adjustment motors. If the adjustment motor is obstructed the Hall sensor pulses will fail. The seat module also detects an obstructed motor from the increased current when the obstruction occurs. The seat module then cancels activation of the adjustment motors.

The adjustment motor can be activated in the same direction again. If the motor remains obstructed, it must be activated in the opposite direction. If the seat can be moved in the opposite direction, then the seat module allows you to activate the original direction again.

If the obstruction in the adjustment motor cannot be cleared, then this motor is no longer used to store the memory function.

### ■ Rear seat adjustment button

In unfavorable situations, the leg room behind the front-passenger seat can seem quite narrow. Someone sitting behind the front-passenger seat may find this unpleasant.

In order to enlarge the space in front of the rear seat on the front-passenger's side, there is an additional button fitted on the center armrest in the rear seat area. This button allows you to operate the front-passenger seat.

The rear seat module behind the front-passenger seat requests the button status via the LIN bus.

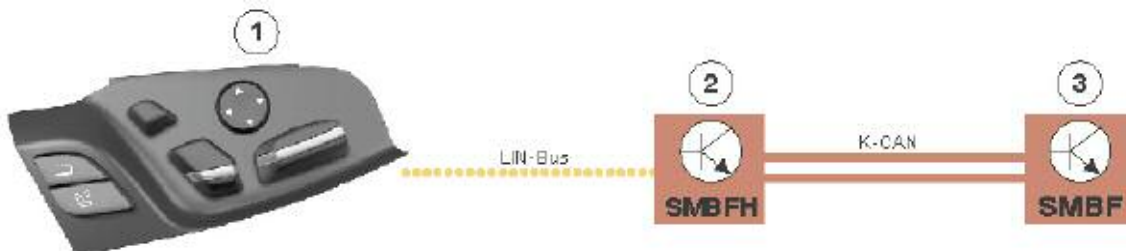
This enables it to detect when the button is pressed. If the button is pressed, the rear seat module behind the front passenger seat prepares itself to carry out a seat adjustment to the front-passenger seat.

When the seat adjustment buttons for the rear seat are now operated, they adjust the front-passenger seat accordingly.

The function is deactivated by pressing the button for operating the front-passenger seat again.

**Note: A seat adjustment made via the buttons on the front-passenger seat has priority over those made from the rear seat.**

### Signal path button for making seat adjustments to the front-passenger seat from the F01/F02 rear seat



Index	Explanation	Index	Explanation
1	Buttons for seat functions	3	Passenger's seat module (SMBF)
2	Seat module, passenger side rear (SMBFH)		

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## Memory Function for the Rear-compartment Comfort Seat

The memory function is available for both the left and right rear passenger seat and can be activated from terminal 30B ON. The memory buttons are connected to the junction box electronics via the LIN bus.

The seat module of the seat concerned is responsible for the memory function. The junction box electronics request the status of the memory buttons via the LIN bus on a cyclical basis. To enable the seat module to read out the status of the memory buttons, the button status must be transferred on several bus systems. The bus systems are:

- LIN bus (JB > buttons)
- LIN bus (buttons > JB)
- K-CAN2 (JB > ZGM)
- K-CAN (ZGM > SM).

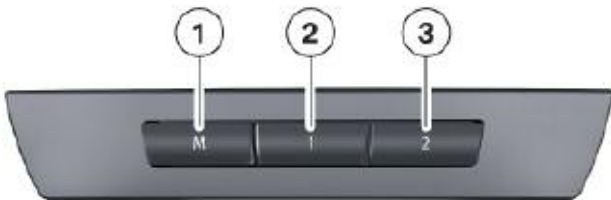
Press the memory button to prepare for storing the memory position. The seat module sends the request to switch on the function indicator. From the function indicator, for example, the customer can recognize that the memory function is ready for storing.

Pressing button “1” or “2” assigns the current position of the driver’s seat to the pressed button. One memory position is available for each of the buttons “1” and “2”.

The data is assigned to the current ID transmitter as part of the Personal Profile, when the memory position is stored.

If the seat module detects an obstructed adjustment motor, then memory adjustments to the motor remain disabled until the motor is no longer obstructed.

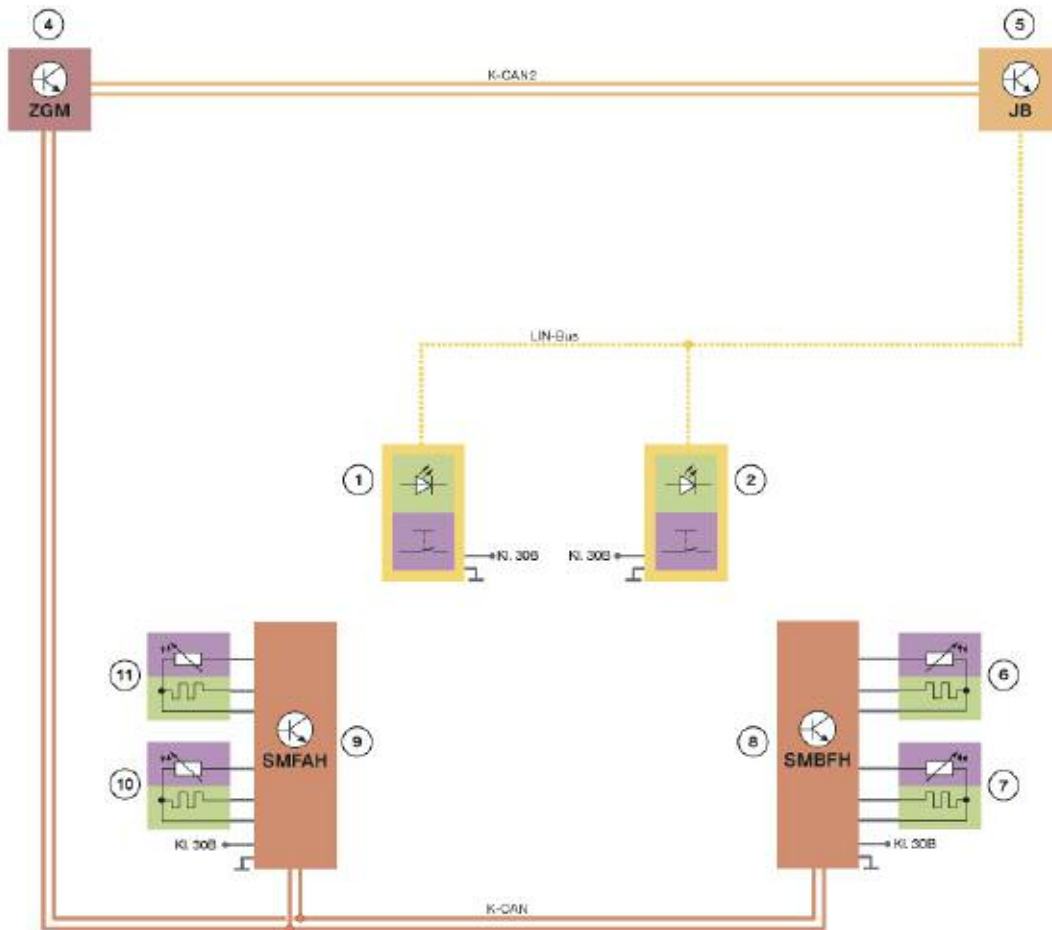
### Memory buttons in the armrests of the F01/F02 driver's side



Index	Explanation
1	M button
2	Button 1
3	Button 2

# Seat Heating in the Rear-compartment Comfort Seat

## System Circuit Diagram, Seat Heating



Index	Explanation	Index	Explanation
1	Seat-heating buttons, driver's side, with function indicator, rear	9	Driver's rear seat module (SMFAH)
2	Seat-heating buttons, front-passenger's side, with function indicator, rear	10	Seat heating, seat surface
4	Central gateway module (ZGM)	11	Seat heating, backrest surface
5	Junction box electronics (JB)	KI. 30B	Terminal 30 basic operation
6	Seat module, passenger side, rear (SMBFH)	K-CAN	Body CAN
7	Seat heating, seat surface	K-CAN2	Body CAN2
8	Seat heating, backrest surface	LIN-Bus	Local interconnect network bus

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When the vehicle wakes up, the JBE determine whether a seat module is installed in the vehicle. It sends a corresponding query via the K-CAN2 for this purpose. The central gateway module transfers the signal to the K-CAN.

The ZGM transfers the signal to the K-CAN. This allows the seat module to receive the request, respond to it via the K-CAN and take control of the seat heating function. This means that the button status of the seat heating is evaluated, and the seat heating is activated and monitored.

The JBE request the button status for the seat heating via the LIN bus on a cyclical basis and sends it via the K-CAN2. The ZGM transfers the request for the heating stage to the K-CAN. The seat module evaluates the request for the desired heating stage and activates the seat heating accordingly. The seat heating is a two-circuit heating system.

#### ■ **Function indicator**

In order to indicate that the seat heating function has been activated, the seat module sends a request via the K-CAN to switch on the LEDs in the button. The request must be transferred on more than one bus system.

The bus systems are, K-CAN (SM > ZGM), K-CAN 2 (ZGM>JB) and LIN (JB>buttons):

#### ■ **Back lighting buttons**

The FRM sends the status of the terminal 58g ON via the K-CAN2. This is how the junction box electronics receive the status of terminal 58g ON. The JBE send the status of the terminal 58g ON to the seat heating buttons via the LIN bus.

#### ■ **Power reduction of seat heating**

The energy management system in the vehicle can activate the seat heating at a reduced power level corresponding to the vehicle's energy balance. The energy management is located in the digital engine-control system.

The digital engine control sends the request to reduce power via the PT-CAN. The ZGM transfers the information to the K-CAN2.

The JBE then receive the request for power reduction and initiates it.

The reduction stages are:

- Operation of seat heating in Stage 2
- Operation of seat heating in Stage 2 at only 50%
- Seat heating OFF.

**Note: In the event of a power reduction, the LEDs in the seat-heating switch are not switched off.**

During a starting cycle (terminal 50 ON) or when the seat adjustment switch is operated, the junction box electronics prevent the seat heating from functioning. The LED indicator for the activated seat heating remains lit.

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## Lumbar Support in the Rear-compartment Comfort Seat

### Lumbar-support Adjustment

Using the lumbar support, the backrest can be individually adapted to the spinal column and thus ensures relaxed driving.

The button for the lumbar support adjustment is located on the side of the center armrest and is connected via the LIN bus to the seat module.

The lumbar support function is fully integrated into the seat module and is adjustable from terminal 30B ON.

The seat module requests the button status for the lumbar support adjustment via the LIN bus on a cyclical basis. The button responds with the current status via the LIN bus.

The seat module evaluates the button status and if necessary activates the lumbar support pump and solenoid valves.

Lumbar support is provided by two inflatable air cushions in the backrest. The desired air cushion is inflated with air or deflated via four solenoid valves until such time that the button for the lumbar-support adjustment is released.

The pump for lumbar-support adjustment delivers the required air pressure. The pump and the solenoid valves are activated from the seat module.

The seat module stores the malfunctions with the lumbar support. In the service workshop, the fault code entry is read out using the diagnostic system.

Fault code memory entries can be:

- Short-circuiting
- Line breaks
- Motor is defective.

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## Active Seat Ventilation for the Rear-compartment Comfort Seat

The active seat ventilation allows the passenger to have individual cooling of the seat and backrest surfaces.

In the F01/F02, a new concept has been introduced for the active seat ventilation. This concept requires only two fans for each seat. The integrated automatic heating and air conditioning system provides the vehicle with climate-controlled air. This means there is sufficient fresh and climate-controlled air in the footwell in front of the rear seats. The fans draw some air from the footwell. The drawn-in air is routed via each air-conditioning pad to the seat and the backrest.

The active seat ventilation is available for the seat and backrest on the rear comfort seat and can be activated from status terminal 15 ON.

The seat module has sole responsibility for the active seat ventilation function. Stage 3 is engaged when the button is pressed for the first time. This sets a high fan stage for seat and backrest.

The next fan setting or OFF is selected on further pressing of the button.

AC stage	Fans, seat	Fans, backrest
3	High	High
2	High	Low
1	Low	Low
0	OFF	OFF

After having been activated for a period in excess of 10 minutes, active seat ventilation is automatically switched down from Stage 3 to Stage 2.

**Note: The active seat ventilation has 4-zone automatic air conditioning as a requirement. The buttons for the active seat ventilation are in the control panel of the automatic rear-compartment air conditioning.**



**Buttons for the F01/F02 active seat ventilation**



Index	Explanation	Index	Explanation
1	Button, active seat ventilation, driver's side rear	2	Button, active seat ventilation, pass side rear

The air intensity of the active seat ventilation is coupled to the fan setting of the automatic rear-compartment air conditioning. This makes it possible to harmonize the fan noises in the rear compartment. The active seat ventilation therefore reaches its maximum value, when the automatic rear-compartment air conditioning is set to the maximum fan setting.

If the automatic rear-compartment air are activated based on a characteristic map conditioning is not switched on, then the fans that is stored in each seat module.

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## Switching on the Rear Active Seat Ventilation

The automatic rear-compartment air conditioning evaluates the button status and sends it via the K-CAN.

The seat module evaluates the status, activates the active seat ventilation with the selected air-conditioning setting, and monitors the function.

Two fans are fitted in each seat. The fans are activated from the seat module depending on the selected setting.

An activated seat ventilation function remains stored for up to 15 minutes after the status terminal 15 OFF. The previously active fan setting for the seat ventilation is switched on again if in this time the status terminal 15 ON is received by the seat module.

The energy management system in the vehicle can deactivate active seat ventilation briefly depending on the vehicle's energy balance. The function indicator is retained however.

### ■ Function indicator

In order to indicate that the seat ventilation function has been activated, the seat module sends a request via the K-CAN to switch on the LEDs in the button. The automatic rear-compartment air conditioning switches on the LEDs.

### ■ Back lighting buttons

The footwell module sends the status of the terminal 58g ON via the K-CAN2. The central gateway module transfers the signal to the K-CAN. Then the automatic rear-compartment air conditioning receives the status terminal 58g ON and activates the back lighting.

**Note: The indicators in the control panel of the automatic rear-compartment air conditioning use black panel technology. A detailed description of the black panel technology can be found in the Product Information “F01/F02 display and control elements”.**

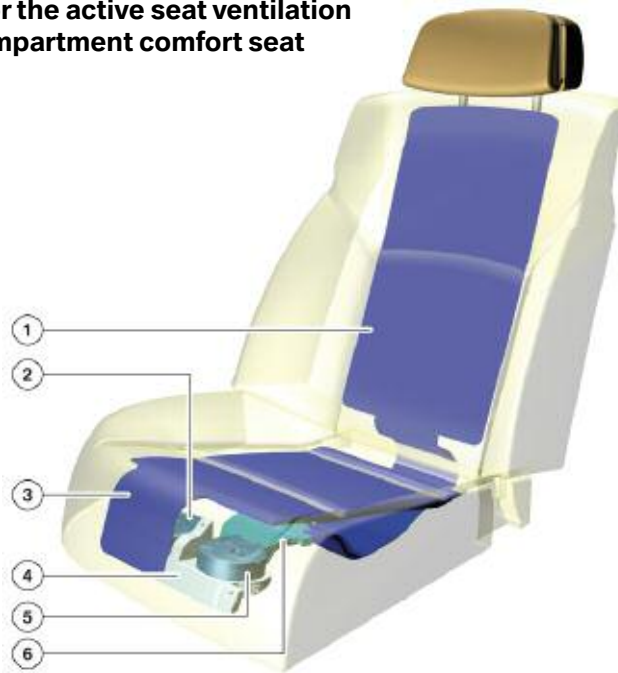
## Air-conditioning Pad

The air-conditioning pad has openings in the area of the seat and backrest surfaces. Air can be drawn in through the openings in order to control the temperature of the seat cover.

Special covers are required for active seat ventilation. The covers have very small air outlets.

The air drawn in by the fans can flow through the air outlets. This cools the seat cover and ensures that the temperature of the seat cover remains pleasant.

### Air-conditioning pad for the active seat ventilation in the F01/F02 rear-compartment comfort seat



Index	Explanation	Index	Explanation
1	Air-conditioning pad, backrest surface	4	Noise dampen for noise reduction
2	Fans, seat ventilation	5	Fans, backrest ventilation
3	Air-conditioning pad, seat surface	6	Adapter for air-conditioning pad, backrest surface

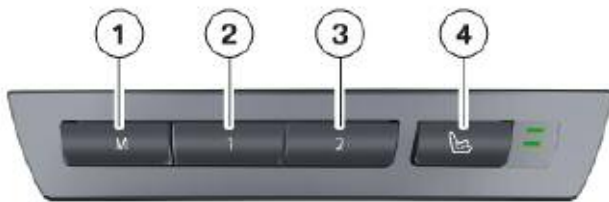
## Massage Function in Rear-compartment Comfort Seat

The optional rear-compartment massage gives the rear-seat passenger even more comfort than in the E65. The rear-compartment massage function is being offered in the F01/F02 for the first time at BMW.

An electropneumatic system is used to implement the massage function.

The massage function is available for both the left and right rear passenger seat and can be activated from terminal 30B ON. The seat module is integrated into the back of the backrest in the left rear and the right rear seat and has sole responsibility for the massage function.

The buttons for the massage function are connected via the LIN bus to the junction box electronics.



Index	Explanation
1	M button
2	Button 1
3	Button 2
4	Massage function button

### Button block in the armrests of the F01/F02 driver's side

The junction box electronics evaluate the status of the massage button and sends the status via the K-CAN2.

The central gateway module transfers the signal to the K-CAN. This allows the seat module to receive the current status of the buttons. The seat module evaluates the status, activates the massage function, and monitors it.

In the backrest of the comfort seat, there is a massage pad for the massage function. Pressing the button starts the massage function at the maximum massage intensity. Pressing the button again switches it to a lower massage intensity level.

Pressing the button once again switches the massage function off.

If the button is pressed for longer than 1.2 seconds during the massage function, the massage function will be switched off.

In order to indicate that the massage function has been activated, the seat module sends the request to switch on the LEDs in the button.

The signal terminal 58g ON is made available through the footwell module. The junction box electronics pass on terminal 58g ON to the button. The button then switches the back lighting on.

## Massage

The massage function is divided into massage cycles. A massage cycle consists of the massage and includes back mobilization and lasts approximately 64 seconds. After this, a new massage cycle begins.

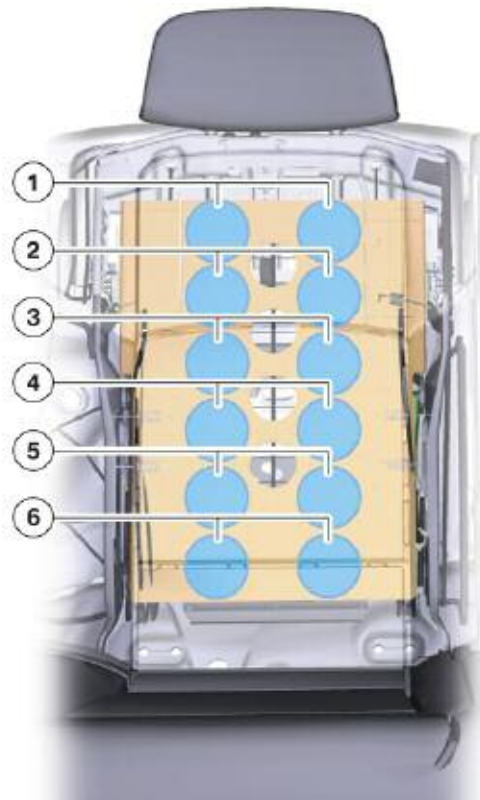
There are twelve massage cushions that help to relieve tension in the back muscles through a wave-like motion along the backrest from top to bottom.

The wave-type motion is created by inflating and deflating the massage cushions. The pressure distribution module activates the massage cushions in pairs simultaneously.

The massage function is designed so that the two upper massage cushions are activated first. Activation in this situation means inflating and deflating the massage cushions with air. Following this, the pair of massage cushions lying beneath are activated and this continues until the bottom massage cushions are reached.

Towards the end of the massage cycle, mobilization of the back begins.

### F01/F02 massage cushions



Index	Explanation	Index	Explanation
1	Massage cushion pair 1	4	Massage cushion pair 4
2	Massage cushion pair 2	5	Massage cushion pair 5
3	Massage cushion pair 3	6	Massage cushion pair 6

Mobilization cushions are used for mobilization. There are six mobilization cushions arranged in the outside shoulder area, in the center of the thorax and in the lumbar area.

The mobilization cushions are simultaneously inflated and deflated periodically and sectionally. For example, the mobilization cushions in the right shoulder and right lumbar as well as the mobilization cushions in the left thorax are pumped up and deflated. Following that, the opposite side is inflated and deflated.

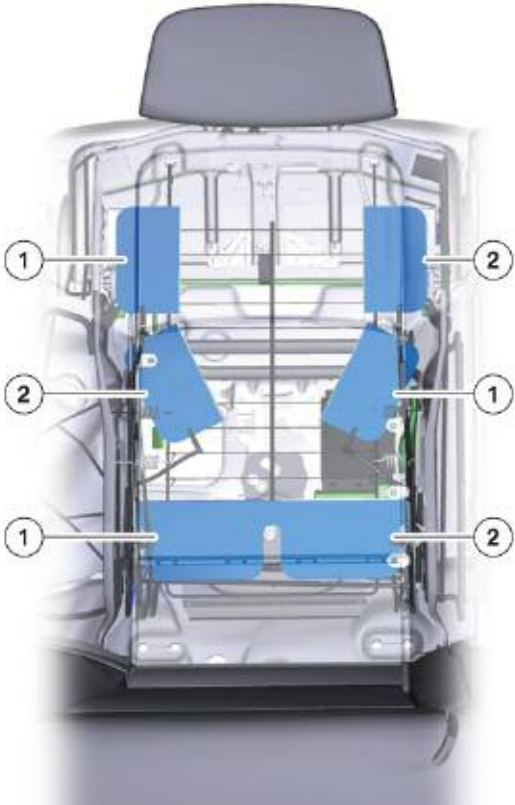
If the lumbar support is set when the massage function has been activated, the seat module deactivates the massage function. This allows the pump for the lumbar support adjustment to supply enough air flow to inflate the lumbar cushions.

After the lumbar support has been set, the massage function continues.

The massage function has a defined run-on. With this run-on the massage cushions and mobilization cushions are fully deflated. The run-on encompasses one massage cycle.

The pump for the lumbar support runs at various speeds depending on the function. Refer to the following table:

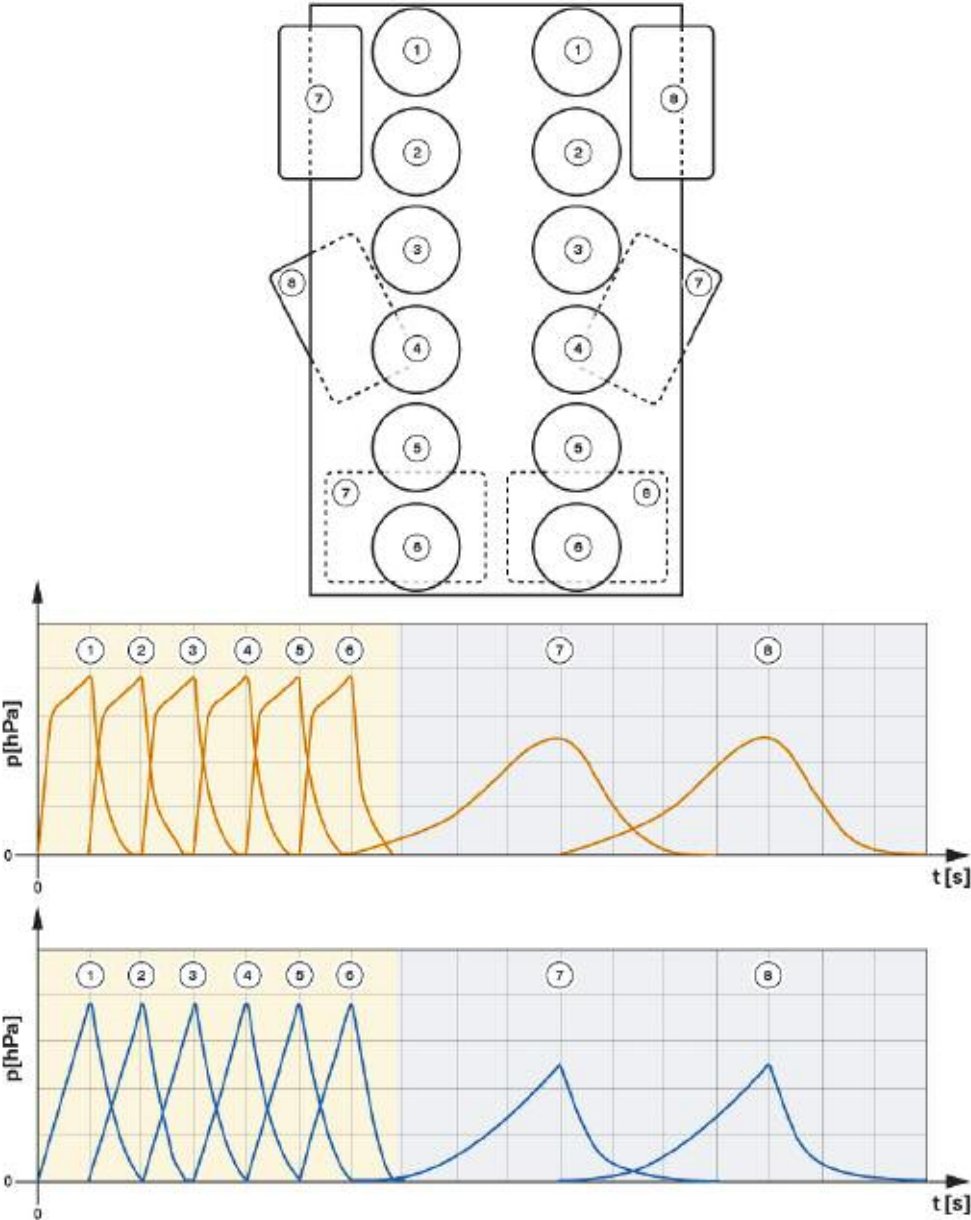
Function	Pump speed
Lumbar support	Maximum RPM
Maximum massage intensity	High RPM
Low massage intensity	Low RPM



Index	Explanation
1	Mobilization cushions, right shoulder, left thorax and right lumbar
2	Mobilization cushions, left shoulder, right thorax and left lumbar

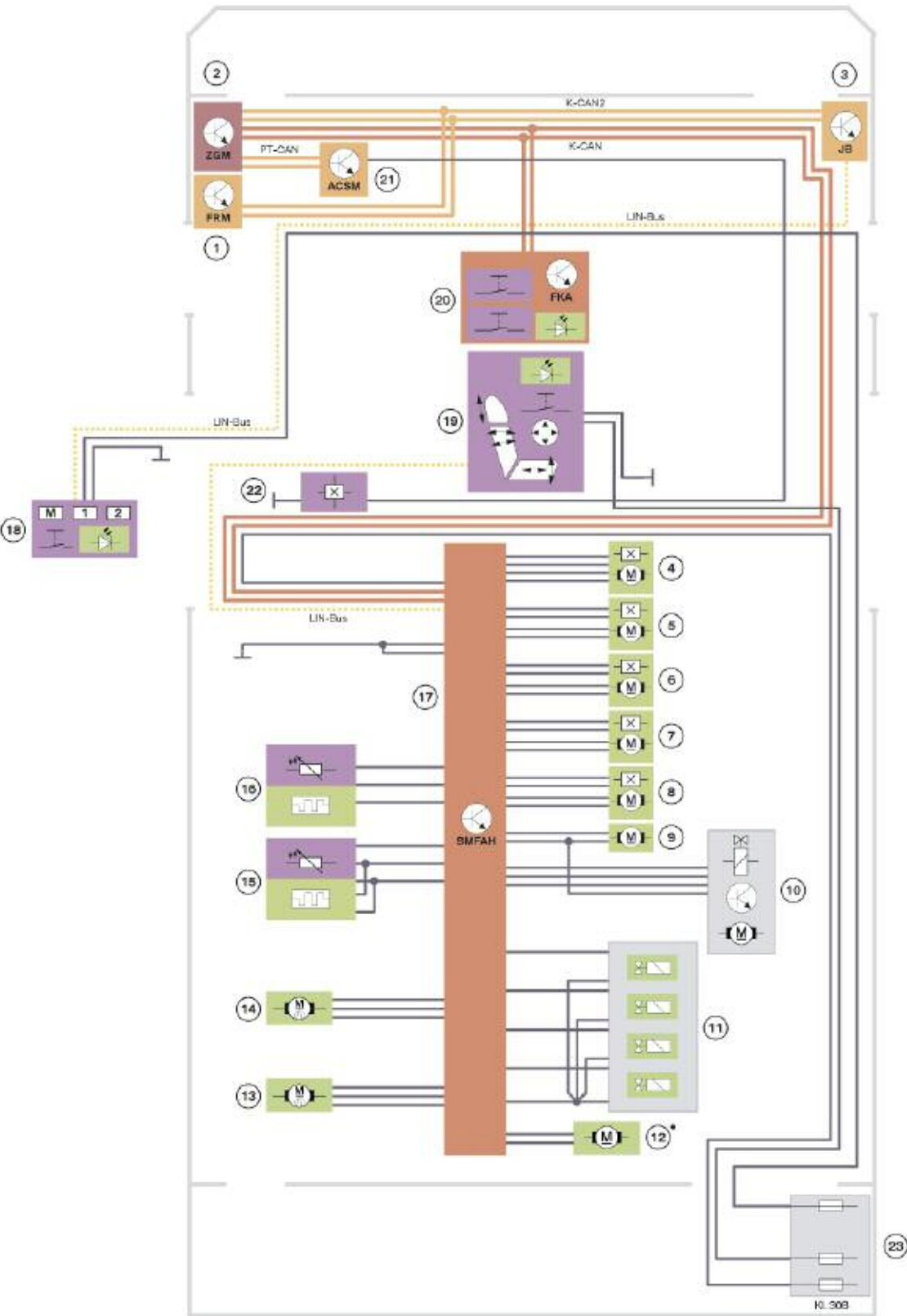
**F01/F02 massage cushions**

**F01/F02 diagram of massage cycle sequence**



Index	Explanation	Index	Explanation
1	Massage cushion pair 1	6	Massage cushion pair 6
2	Massage cushion pair 2	7	Mobilization cushions, right shoulder, left thorax and left lumbar
3	Massage cushion pair 3	8	Mobilization cushions, left shoulder, right thorax and left lumbar
4	Massage cushion pair 4	Orange	Graph of max. massage intensity
5	Massage cushion pair 5	Blue	Graph of min. massage intensity

# System Circuit Diagram, Rear Comfort Seat Behind the Driver





Index	Explanation	Index	Explanation
1	Footwell module (FRM)	15	Seat-heating pad, backrest surface
2	Central gateway module (ZGM)	16	Seat-heating pad, seat surface
3	Junction box electronics (JB)	17	Seat module, driver's side, rear (SMFAH)
4	Motor, longitudinal seat adjustment (SLV)	18	Button block in the armrest, driver's side
5	Motor, seat-inclination adjustment (SNV)	19	Buttons, seat functions, driver's seat
6	Motor, backrest-inclination adjustment (LNV)	20	Integrated automatic heating and air conditioning IHKA
7	Motor, upper backrest adjustment (LKV)	21	Advanced Crash Safety Management (ACSM)
8	Motor, head-restraint height adjustment (KHV)	22	Seatbelt-buckle switch
9	Pump, lumbar support/massage function	23	Distribution box in luggage compartment
10	Pressure distribution module, massage/lumbar support	K-CAN2	Body CAN2
11	Solenoid valves for lumbar support	K-CAN	Body CAN
12	Pump for lumbar support*	LIN-Bus	Local interconnect network bus
13	Fan, active seat ventilation, backrest surface	KI. 30B	Terminal 30 basic operation
14	Fan, active seat ventilation, seat surface		

\* Pump in a vehicle equipped with lumbar support. In a vehicle equipped with massage seats, a different pump is used.

This pump supplies the massage seat and lumbar support with air.



#### K-CAN signals at the seat module

In/Out	Information	Source/sink	Function
In	Outside temperature	Outside temperature sensor > instrument cluster	Ambient conditions when faults are stored
In	Power reduction stage	Energy management system > digital engine control	Power reduction of seat heating

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### **Seatbelt-buckle Switch in the Rear Seat**

The seatbelt-buckle switch signals whether the seatbelt is fastened or not. When the seatbelt is fastened, the seat module adjusts the head restraint with an electric motor to the previously used head restraint height.

If the seatbelt has not been fastened, then the head restraint is fully retracted. This increases the field of vision out the back window.

The Advanced Crash Safety Management evaluates the seatbelt-buckle switch and sends its status via the PT-CAN. The central gateway module transfers the signal to the KCAN. This provides the seat module with information about whether the seatbelt is fastened or not. The seat module sets the head restraint to the maximum height if the seatbelt is on, or completely back if the seatbelt is not on.

# System Components

## Controls and Control Units

### Controls

The controls for the seat functions are connected depending on the seat equipment. The controls are:

- Seat-adjustment switches
- Lumbar support switch
- Memory buttons
- Active-seat button
- Active seat ventilation button
- Massage function button.

Refer to the following table:

Switch/button connection	Application
Direct	Seat adjustment motor is directly activated.
Resistance-coded	The seat module reads in the switch directly and effects the request triggered by the switch.
LIN-Bus	The seat module cyclically requests the status of the switch and effects the request triggered by the switch.
LIN bus > K-CAN2	For example, the buttons in the armrests are connected to the footwell module or the junction box electronics. The control units evaluate the button status and send it via the K-CAN2. The signal is transferred from the central gateway module to the K-CAN.
Control unit > K-CAN	For example, the button status for the seat heating in the front seats is evaluated by the integrated automatic heating and air conditioning system and issued via the K-CAN. For example, the button status for the active seat ventilation in the rear seats is evaluated by the automatic rear-compartment air conditioning and issued via the K-CAN.

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## Control Units

### ■ Junction box electronics

The junction box electronics each have a control outlet for the seat heating. In seat heating with a seat heating module, the junction box electronics activate the seat heating via the LIN bus.

**Note: The junction box electronics cede activation of the seat heating to the seat module of the respective seat.**

### ■ Seat heating module

The seat heating module evaluates the LIN bus signal from the junction box electronics. The seat heating module is connected by means of three connectors. One connector establishes the connection to the junction box electronics. The other two connectors are responsible for connecting the seat heating.

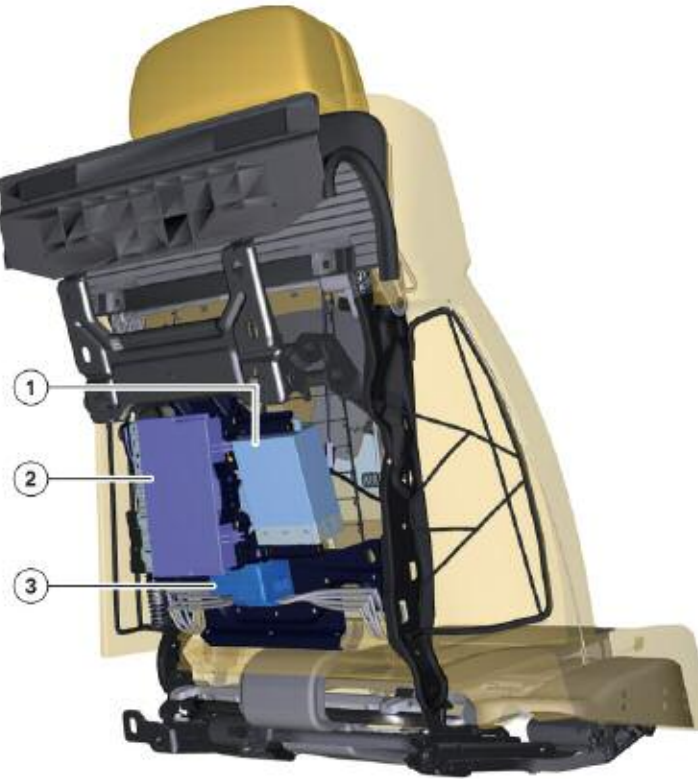
### ■ Seat module

The seat module receives activation information for the seat heating via the K-CAN. Similarly, the seat module evaluates the button status of the controls for the various seat functions.

The requests made by the memory buttons for the door mirror are made available via the K-CAN. The positions for seat memory are stored in the seat module.

The requirements of the seat-adjustment switches are executed by the seat module.

## Pressure Distribution Module



Index	Explanation	Index	Explanation
1	Lumbar support pump	3	Pressure distribution module, massage/lumbar support
2	Seat module		

A pressure distribution module located in the backrest is for inflating and deflating the respective massage or mobilization cushions. The pressure distribution module distributes the air for the massage cycle. There is a motor for this that drives an eccentric shaft. The eccentric shaft is designed so that it alternately opens and closes the air inlets and outlets of the massage cushions and mobilization cushions.

The required air is supplied by the pump for the lumbar-support adjustment. The seat module receives the request for the required air for the massage function from the pressure distribution module. The pump for the lumbar-support adjustment is activated by the seat module.

**Note: Lumbar-support adjustment has priority over the massage function.**

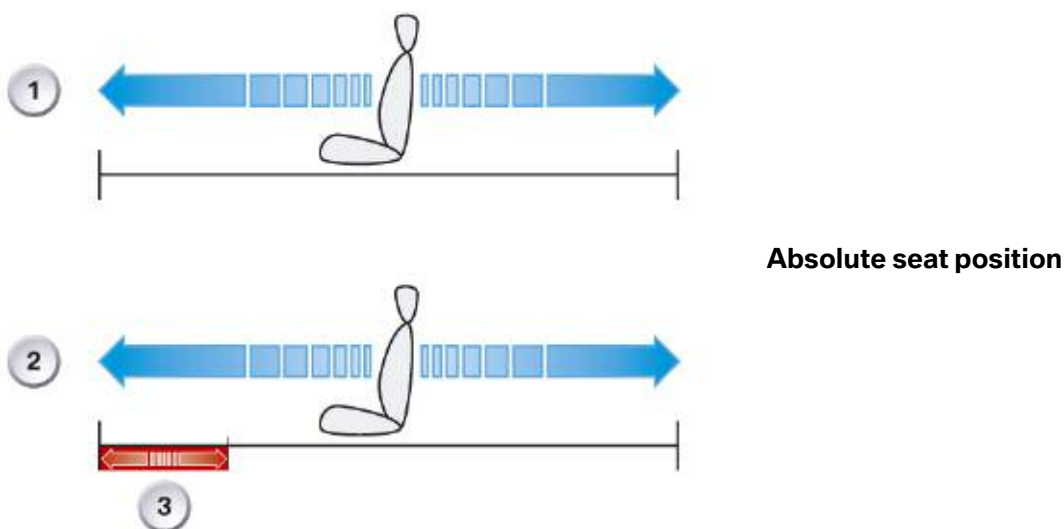
## Service Information

### Calibration of the Drivers/front-Passenger Seat in the US Version

The position of the driver's seat in the longitudinal direction can become implausible in the course of that seat's life. This can be caused by repeatedly moving the seat forward and back in the longitudinal direction.

These movements can give rise to an unauthorized position delta which no longer provides for a determination of the seat position.

The seat must therefore be recalibrated. Calibration is easy and can be performed by the customer him-/herself. Please refer to the Owner's Handbook.



Index	Explanation	Index	Explanation
1	Relative seat position	Blue arrow	Total seat-adjustment travel
2	Absolute seat position	Red arrow	Seat-adjustment travel (5% woman)
3	5% woman area		

**Note: The seat must be moved in the mechanical front stop. Then the seat is calibrated and can be adjusted in the desired seat position.**

**If the seat is unable to reach the mechanical front stop, the calibration must be performed in the service garage/workshop.**

**This situation can come about if, for example, a coin is stuck in the seat-adjustment rail and blocks the adjustment travel.**

If repairs are made to the seat, the seat must always be calibrated. This is necessary to guarantee seat-position recognition, or more precisely to increase the safe and reliable function of seat-position recognition.



Switching the seat control unit for test purposes for example with one from another vehicle is possible. The seat calibration will be lost however. Because the possibility of the calibration being in order when the old seat control unit is reinstalled cannot be ruled out, it is necessary to calibrate the seat. Refer to the repair instructions for seat calibration.

**Note: The ACSM receives a message from the seat module once a second as to whether calibration of the seat is necessary.**

**The signal is transferred in the central gateway module from the K-CAN to the PT-CAN.**

**As soon as the message contains the information “Calibration necessary”, the ACSM outputs a Check Control message via the PT-CAN to the instrument cluster.**

The seat control unit can likewise trigger the Check Control message. This is possible if for instance the Hall sensor of the longitudinal drive motor is defective. A repair in the garage/ workshop will therefore be necessary. The seat must be calibrated after the repair.

Check Control Message	Meaning	Information in Central Information Display
	Seat must be recalibrated.	Seat calibration necessary.
	Seat-position recognition malfunctioning!	Seat-position recognition malfunctioning! Have the system checked by BMW Service at the next available opportunity.

## Replacing Components

The seats consist of a large number of components. For this reason, the components can be replaced if one becomes faulty.

The Repair Instructions must be observed when replacing or making repairs to a seat. It is also important that only genuine BMW replacement parts are used. This ensures that the seat functions remain intact.

For example, the motors for the seat adjustment cannot be replaced separately from the corresponding output shaft, because they form one electromechanical unit.